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Action research as instructional supervision: Impact on the professional development of university based supervisors and science student teachers

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Abstract

This study examines the effect of action research on the professional development of supervisor and student teacher in a practicum setting. In this collaborative action research, both the supervisor and student teacher identified problems of teaching physics for 16 years old students, planned an action to overcome it,excuted and reflect on the effectiveness of the plan. Findings showed the student teacher improved her own subject matter knowledge, developed pedagogical content knowledge and enhanced research skills. For the supervisor, the collaborative action research enabled her to reflect on the effectiveness of her supervision and of the methods course in helping student teachers to teach.

Keywords: Collaborative action research; physics teaching; subject matter knowledge; pedagogical content knowledge; research skills; supervision; practicum.

1. Introduction

Practicum is a platform in which a student teacher applies educational theory in their practice. Before going for industrial training (i.e. practicum), student teachers are exposed to among others the subject matter they are going to teach, philosophy of education, curriculum and pedagogy and learning theories. In the practicum setting, student teachers also acquire and developed knowledge based on their own teaching experience. The ability to connect theory and practice as well as developed reliable teaching knowledge depend on the ability to reflect on practice (Maarof 2007) and the level of reflective thinking among student teachers is low due to lack of teaching experience. One of the methods to promote reflective thinking is through action research during practicum or teaching practice (Zon 1994 ; Rahman, Jelas & Osman 1999; Maarof 2007). Research also shows that quality practicum supervision leads to development of quality student teachers. Supervision needs to be performed by professionals that have analytical thinking and practices reflective thinking thus the feedback given to student teachers are immediate and reliable (Jordan, Phillips and Brown 2004). Thus this study is to investigate the impact of action research on the professional development of one student teacher and the supervisor. Thus the research

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questions were: 1) What aspects of professional development of the student teacher experienced as a result of conducting action research? and, 2) What aspects of professional development of the university based supervisor experienced as a result of conducting action research?

1.1 Action research and teaching practice

Action research also known as 'teacher-research' is a form research that aims to improve practice and consequently students' learning. As suggested by Elliot (1991) action research is a process that relates to the moral aspects of teaching. Action research is often connected to the professional development of teachers in which as argued by Ovens (2004), action research has the potential to structure the student teachers' learning experience in a meaningful way. As suggested by Liston dan Zeichner (1990) the strength of doing action research is that it alerts the student teacher of the gap between their teaching and the learning experienced by the students. Thus action research has the potential to provide positive impact on the quality of supervision between the supervisor and the student teacher.

2. Methodology

The model of action research adopted in this study is a collaborative action research: in which I as the supervisor along with a student teacher performed the phases of action research; a) identify and diagnose a particular teaching and learning problem, b) planned a teaching and learning strategy to overcome the problem, c) implement the teaching and learning plan and d) evaluate the effectiveness of the plan. This paper reports on an action research conducted by a student teacher during the practicum. At the same time my reflection on effectiveness of my supervision is also being documented. Data is collected through the reflection journals written by the student teacher, interview between the student teacher and the supervisor, supervisor's observation notes on the classroom teaching of the student teacher and the supervisor's own reflective notes. The student teacher was asked to reflect on 1) the action research that was conducted by the student teacher in overcoming the teaching and learning problem, 2) the effectiveness of the supervision and c) the role of the university courses in helping her to teach. The action research involved a science student teacher teaching physics for 16 years old and it was conducted over five weeks. The qualitative data which consists of the writings of reflective journals and interviews were analyzed for themes related to aspects of professional development of both the supervisor and the student teacher.

2.1 The action research cycle of the study

Based on one of her teaching sessions, student teacher Ms. T, was concern of a misconception that her students have on the concept of 'equilibrium'. She found that the students have the view that 'an object moving at constant velocity is not in an equilibrium state'. Ms T and I searched the literature on students' misconceptions on force to identify in the cause of this misconception and one of the reasons is that students are unable to identify correctly the forces acting on an object. To test the hypothesis Ms. T gave a diagnostic test to the students on their ability to recognize the acting forces on an object in various situations and the test showed that the students are unable to differentiate the forces according to magnitude, direction and starting point of the acting force. Thus, the action plan was to teach the students how to draw as well as identify forces acting on an object that is in an equilibrium state both in the vertical and horizontal situations. The teaching and learning process involves Ms. T. using simulation, demonstration, paired discussion and the effectiveness of the plan was measured through another diagnostic test on the ability of the students to identify and draw the forces correctly. The results showed that students had an increase understanding of force and were able to draw the forces correctly compared to prior implementing the action plan and in the third testing of the same concept with the students, it was found that there was a decrease in understanding but was still higher compared to before implementing the action plan. This showed that misconceptions as reported in the literature are difficult to change and it takes a longer time to overcome it.

3. Findings

3.1 The effect of conducting action research in a practicum setting on the professional development of the student teacher relates to three aspects: a) a deeper understanding of the subject matter, b) knowledge and understanding about teaching and how to teach and c) knowledge and understanding on research skills.

3.1.1 Deeper understanding of the subject matter

In planning the action plan, Ms. T came to realize that she too has misconceptions about forces acting on an object in an equilibrium state:

‘ I did not understand why a moving object is said to be in the state of equilibrium. This misconception came about because I only considered the initial state of the movement. It is obvious that to move an object one needs a resultant force thus the force acting on it needs to be bigger than the friction force’

Nevertheless, Ms. T’s understanding on force improves as result of the action research she conducted. Ms T indicated that

‘At the beginning of planning for teaching the concept of equilibrium force, I had problems in my understanding of concepts of equilibrium force, but through the process of reading, preparing, planning and reflection during action research, my understanding of the force deepens’

3.1.2 Knowledge and understanding about teaching and learning to teach

Throughout the action research process Ms T gained conception of effective teaching and learning to teach effectively. Based on one to one interview, Ms. T indicated she would not be concern of students’ understanding if she did not adopt the action research in her practice. This is because the school culture where she did her teaching practice, like in most other schools in Malaysia, focuses on covering the syllabus and achieving good examination results. Thus, through action research student teachers are able to implement innovative ideas in their practice. Ms. T also learned how to teach effectively by conducting action research. The pedagogical content knowledge of teaching force is being developed in which Ms. T provided simulation and analogies in the process of teaching it. Ms. T was able to create analogy that was relevant to the Malaysian students:

‘For example, in order to feel and imagine the forces acted on a book resting on a table, we could ask a student to role play as a table while another student place a heavy book on the palm of the first student. Thus, the first student will feel a force acting on the palm by the book that is gravitational force and the normal force acting on the book by the student’s palm’

Ms. T further suggests that even though the physics methods course introduces a variety of demonstrations but there is no demonstration specific to teaching of equilibrium forces. This indicates that physics methods course should stress more on the development of pedagogy related to specific topics. Thus the development of pedagogical content knowledge is important in pre-service teacher education (Abell 2007; Halim 2009).

3.1.3 Knowledge and understanding of research skills

Another aspect of professional development experienced by Ms. T as a result of the action research process was on the development of knowledge and understanding of research skills. As Ms. T wrote:

‘As a first time researcher I gained a lot of experience after conducting action research. I am able to know the systematic flow of doing action research and it also sharpen my reflective skills even though it’s challenging. This is new and interesting academic experience for me’

Understanding about research skills was also shown in study by Feldman (2005) that involved collaborative action research among the physics teachers. The nature of action research is about teachers solving real and meaningful problems thus knowledge and skills gained from action research is meaningful (Elliot 1991).

3.2 Professional development of university based superviso

Information on professional development of the university supervisor was obtained from Ms. T’s reflection as well as my own reflective notes. The form and nature of supervision helped Ms T to connect theory and practice. According to Ms. T

'*my supervisor has guided me and led me step by step in the action research process. In planning the intervention my supervisor gave ideas and lend me physics and methods books to refer for ideas'*

As the supervisor, I realized that my knowledge on misconceptions enabled me to identify the misconceptions in detail. However, my pedagogical knowledge to overcome the misconceptions was limited to suggestions from previous studies and the ideas were unable to be implemented directly in our own situation. Thus with minimal guidance on this matter, Ms. T searched for teaching ideas to overcome the misconceptions through internet search and reference books that I borrowed. I felt that if I could provide innovative teaching strategies in overcoming the misconceptions perhaps the impact of action research on student learning of understanding force would be more effective. As indicated by Feldman (2005) improving the supervision skills would enable the supervisor to be a more effective supervisor in the supervision of student teachers. Another role of supervision that appears to facilitate her learning as indicated by Ms T in her reflective writing is the ability of the supervisor to be as a peer rather than as a supervisor. As indicated by Ovens (2004) reflective activity such as 'peer coaching' should not be provided by the student teacher's peers only but the supervisor could also play the role as a peer and collaboration action research is a platform of such a relationship between student teacher and supervisor.

My own reflection showed that I need to provide more structure reflective questions for Ms T to reflect on so that she is able to conduct systematic and structure thinking. This indicates that I need to practice reflective thinking that goes beyond 'descriptive writing and descriptive reflection' types of reflective thinking so that student teacher is able to critical self analyze her teaching while the supervisor critical self analyze the effectiveness of her supervision.

4. Conclusion

In general, the process of action research was able to develop and enhance various aspects of the professional development of the student teacher. The experience of action research also allowed the student teacher to develop *situational knowledge* that will be the basis of further professional knowledge development and the knowledge gained is professional, valid and reliable. The action research process also helped the university supervisor realized the need to act as peer rather than as an evaluator in the practicum setting as a way to induct student teaching in the actual learning and teaching environment. The action research process has also enabled the student teacher to connect theory to practice thugh improved pedagogical thinking and practice.

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